REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1, 4, 6, and 9-26 are presently active in this case. Claims 1 and 6 have been amended, Claims 2, 3, 5, 7, and 8 have been canceled without prejudice or disclaimer and Claims 10-26 have been added. No new matter has been entered. Support for the claim amendments can be found throughout the specification.

The present Amendment in being submitted in response to the Notice of Non-Compliant Amendment dated May 5, 2005. The Request for Continued Examination (RCE) did not authorize the filing of the non-entered Amendment After Final filed on March 22, 2005, however the Amendment After Final was entered upon filing of the RCE, thereby resulting in the incorrect claim status identifiers.

In order to correct the claim status identifiers, the Applicants have submitted herewith a correct claim amendment section that modifies the claims as presented in the March 22, 2005, Amendment After Final to include the claim amendments set forth in both the Amendment filed on April 26, 2005, and the Supplemental Amendment filed on May 3, 2005. The Applicants note that the claim amendments set forth in the Amendment After Final have been removed by the amendments set forth herein. Furthermore, the Applicants note that Claims 2, 7, and 8, have been reintroduced as new Claims 18-20. Additionally, the Remarks sections from the Amendment filed on April 26, 2005, and the Supplemental

Amendment filed on May 3, 2005, are being incorporated herein. Furthermore, new Claims 21-26 have been added for the first time herein.

Claims 1-3 were rejected under 35 U.S.C. 103(a) as being unpatentable over Khan et al. (U.S. Pub. No. 2002/0164417). Claims 1-4 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rigney et al. (U.S. Patent No. 6,274,193). Claims 6-9 were rejected under 35 U.S.C. 103(a) as being unpatentable over Khan et al. or Rigney et al. in view of Sangeeta et al. (U.S. Patent No. 6,485,780). For the reasons discussed below, the Applicants traverse the obviousness rejections.

The basic requirements for establishing a *prima facie* case of obviousness as set forth in MPEP 2143 include (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, (2) there must be a reasonable expectation of success, and (3) the reference (or references when combined) must teach or suggest all of the claim limitations.

The Applicant submits that a *prima facie* case of obviousness has not been established in the present case because (1) the references, either taken singularly or in combination, do not teach or suggest all of the claim limitations, and (2) there is no suggestion or motivation to modify the references to arrive at the present invention.

Claim 1 of the present application recites a method of repairing a Ni-based alloy part having an undercoat layer and a topcoat layer stacked on a Ni-based alloy base when the topcoat layer is damaged. The method comprises the steps of removing a damaged portion of

the topcoat layer and a denatured portion of the undercoat layer corresponding to the damaged portion, forming another undercoat layer formed of MCrAlY in a removed portion where the original undercoat layer has been removed by spraying performed in the atmosphere at a spray particle speed of 300 m/s or more and a base-material temperature of 300°C or less, and forming another topcoat layer formed of ZrO_2-based ceramics where the topcoat layer has been damaged.

The Khan et al. reference does not teach or even suggest several features recited in Claim 1 of the present application. For example, the Khan et al. reference does not disclose or suggest a method including forming another undercoat layer in a removed portion where the original undercoat layer has been removed by spraying performed in the atmosphere at a spray particle speed of 300 m/s or more. In fact, the Khan et al. reference makes no mention of any spray particle speed. Furthermore, the Khan et al. reference does not disclose a method including forming another undercoat layer in a removed portion where the original undercoat layer has been removed by spraying performed in the atmosphere at a base-material temperature of 300°C or less. However, a previous Official Action states that in the absence of a showing of criticality, the selection of optimum values for the temperature and spray velocity would have been within the skill of one practicing in the art.

MPEP 2144.05 III. B. states that only result-effective variables can be optimized. This section notes that "[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine

experimentation." (MPEP 2144.05 III. B. citing *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) (The claimed wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment capacity is a function of the tank volume to contractor ratio, and therefore the parameter optimized was not recognized in the art to be a result-effective variable.). See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the formation of an alloy).) The Applicants respectfully submit that the Khan et al. reference does not recognize either the spray particle speed or the base-material temperature during removal of an undercoat layer as result-effective variables, i.e., variables that achieve a recognized result. This teaching is only present in the present application, and is not disclosed in any cited prior art reference.

The specification of the present application teaches in a first aspect of the invention that if the spray particle speed is set at less than 300 m/s, than an oxide film is easily deposited on another undercoat layer to be formed where the original undercoat layer has been removed. (See page 6, lines 4-9.) Thus, the present invention teaches that by setting the spray particle speed to be 300 m/s or more, an oxide film is prevented from forming and being brought into contact with another undercoat layer. The Kahn et al. reference does not teach or even suggest such a feature, nor does the Kahn et al. reference recognize the benefits of controlling such a parameter in order to achieve the unrecognized results taught by the present invention. In fact, the Kahn et al. reference does not even mention the spray particle speed parameter at all. The Kahn et al. reference does not even consider the idea of

preventing oxidation of the damaged portion when the repairing material is deposited, as the repairing material is stabilized zirconia which has been oxidized in the first place. Accordingly, one of ordinary skill in the art in view of the Kahn et al. reference would not have been motivated to even modify the invention described therein to arrive at the present invention. For at least these reasons, the Applicants respectfully submit that Claim 1 is not unpatentable in view of the Kahn et al. reference.

Furthermore, as noted above, the Khan et al. reference does not disclose or suggest a method including forming another undercoat layer in a removed portion where the original undercoat layer has been removed by spraying performed in the atmosphere at a base-material temperature of 300°C or less. The specification of the present invention teaches that the temperature of the base-material should be set at 300°C or less in the first aspect of the invention, because if the temperature exceeds 300°C, then the base-material will be heat damaged. The Kahn et al. reference makes no mention of such a teaching.

The Kahn et al. reference does not disclose spraying to form another undercoat layer where the base material is at any specific temperature. The Kahn et al. reference describes drying the slurry coating at a temperature between 20°C and 100°C, and finally heat-treating at 55°C to 750°C to remove the halogens, halogen gas, or residual water. (See paragraph [0014].) However, the Kahn et al. reference does not mention forming another undercoat layer by spraying performed in the atmosphere at a base-material temperature of 300°C or less. The Applicants consider that the Kahn et al. process is carried out as if halogen of a chloride resides, then it will harm the base material. Accordingly, one of ordinary skill in the

art in view of the Kahn et al. reference would not have been motivated to even modify the invention described therein to arrive at the present invention. For at least these reasons, the Applicants respectfully submit that Claim 1 is not unpatentable in view of the Kahn et al. reference.

The Rigney et al. reference does not teach or even suggest several features recited in Claim 1 of the present application. For example, the Rigney et al. reference does not disclose or suggest a method including forming another undercoat layer in a removed portion where the original undercoat layer has been removed by spraying performed in the atmosphere at a spray particle speed of 300 m/s or more. In fact, the Rigney et al. reference makes no mention of any spray particle speed. Furthermore, the Rigney et al. reference does not disclose or suggest a method including forming another undercoat layer in a removed portion where the original undercoat layer has been removed by spraying performed in the atmosphere at a base-material temperature of 300°C or less. However, the previous Official Action states that in the absence of a showing of criticality, the selection of optimum values for the temperature and spray velocity would have been within the skill of one practicing in the art.

As noted above, MPEP 2144.05 III. B. states that only result-effective variables can be optimized. This section notes that "[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." The Applicants respectfully submit that the Rigney et al. reference

does not recognize either the spray particle speed or the base-material temperature during removal of an undercoat layer as result-effective variables, i.e., variables that achieve a recognized result. This teaching is only present in the present application, and is not disclosed in any cited prior art reference.

The specification of the present application teaches in a first aspect of the invention that if the spray particle speed is set at less than 300 m/s, than an oxide film is easily deposited on another undercoat layer to be formed where the original undercoat layer has been removed. (See page 6, lines 4-9.) Thus, the present invention teaches that by setting the spray particle speed to be 300 m/s or more, an oxide film is prevented from forming and being brought into contact with another undercoat layer. The Rigney et al. reference does not teach or even suggest such a feature, nor does the Rigney et al. reference recognize the benefits of controlling such a parameter in order to achieve the unrecognized results taught by the present invention. For at least this reason, the Applicants respectfully submit that Claim 1 is not unpatentable in view of the Rigney et al. reference.

Furthermore, as noted above, the Rigney et al. reference does not disclose or suggest a method including forming another undercoat layer in a removed portion where the original undercoat layer has been removed by spraying performed in the atmosphere at a base-material temperature of 300°C or less. The specification of the present invention teaches that the temperature of the base-material should be set at 300°C or less in the first aspect of the invention, because if the temperature exceeds 300°C, then the base-material will be heat damaged. The Rigney et al. reference makes no mention of such a teaching.

The Rigney et al. reference does not disclose spraying to form another undercoat layer where the base material is at any specific temperature range. The Rigney et al. reference describes a temperature range of 900-1150°C for the heat treatment of a metal deposited on surface (30) to diffuse the metal into coating (22). (Column 6, lines 9-11.) However, the Rigney et al. reference does not mention forming another undercoat layer by spraying performed in the atmosphere at a base-material temperature of 300°C or less. For at least this reason, the Applicants respectfully submit that Claim 1 is not unpatentable in view of the Rigney et al. reference.

Accordingly, the Applicants submit that a *prima facie* case of obviousness has not been established with respect to Claim 1. Thus, the Applicants respectfully request the withdrawal of the obviousness rejections of Claim 1.

Claims 4, 10-14, and 18 are considered allowable for the reasons advanced for Claim 1 from which they depend.

Claim 6 of the present application recites a method of repairing a Ni-based alloy part having an undercoat layer and a topcoat layer stacked on a Ni-based alloy base when the topcoat layer is damaged. The method comprises the steps of removing a damaged portion of the topcoat layer and a denatured portion of the undercoat layer corresponding to the damaged portion, applying spraying to a removed portion where the undercoat layer has been removed at reduced pressure, a spray particle speed of less than 300 m/s, and a base-material temperature of 600°C or less, and forming another topcoat layer formed of ZrO_2-based ceramics in the damaged portion of the topcoat layer.

Neither the Khan et al. reference nor the Rigney et al. reference disclose or suggest a method including applying spraying to a removed portion where the undercoat layer has been removed at a spray particle speed of less than 300 m/s. As noted above, the Kahn et al. and the Rigney et al. references do not even discuss the issue of spray particle speed curing the spraying application of an undercoat layer. The Applicants respectfully submit that the Khan et al. reference and the Rigney et al. reference do not recognize the spray particle speed during removal of an undercoat layer as a result-effective variable. Thus, these references cannot be said to render obvious a spray particle speed of less than 300 m/s, as recited in Claim 6. Furthermore, the Sangeeta et al. reference does not appear to supplement this deficiency. The specification of the present application teaches that the spray particle speed in the second aspect of the invention is set at less than 300 m/s, because if the spray particle speed is 300 m/s or more in the second aspect, then the energy density of the frame increases at low pressure causing a substantial increase in the base-material temperature. None of the references disclose such a teaching, and therefore one of ordinary skill in the art would not have had any motivation to modify those references to arrive at the present invention as recited in Claim 6. Thus, for at least this reason, the Applicants respectfully submit that Claim 6 is not unpatentable in view of the above combination.

Accordingly, the Applicants submit that a *prima facie* case of obviousness has not been established with respect to Claim 6. Thus, the Applicants respectfully request the withdrawal of the obviousness rejection of Claim 6.

Claims 9, 15-17, 19, and 20 are considered allowable for the reasons advanced for Claim 6 from which they depend.

Additionally, the Applicants note that an object of the present invention is to prevent oxidation of the undercoat layer which serves as an adhesive agent between the topcoat layer and the base material from the two viewpoints of providing the undercoat layer with oxidation resistance, and strengthening the topcoat layer to protect the undercoat layer below. The present invention has the idea of providing the undercoat layer with stronger resistance when repairing it. However, the Rigney et al., Khan et al., and Sangeeta et al. references do not disclose the structure and the technical advantage of the present invention. Therefore, the present invention is patentably distinguishable over the cited references.

As described in amended Claim 1, the present invention is characterized in that another undercoat layer is formed of MCrAlY and another topcoat layer is formed of ZrO_2-based ceramics, and are each used for repairing. In more detail, for example, as described in new Claims 12-17, the original undercoat layer and the another undercoat layer are formed of different material, and the original topcoat layer and the another topcoat layer are formed of different material. Additionally, as described in new Claim 18, the original undercoat layer is formed of Co-based MCrAlY, and the another undercoat layer is formed of a Ni-based MCrAlY having excellent oxidation resistance. Furthermore, as described in Claim 10, the original topcoat layer is formed of $ZrO_2 - 8Y_2O_3$ and the another topcoat layer is formed of ZrO_2-Dy_2O_3 or ZrO_2-Yb_2O_3 having excellent oxidation resistance. Such features are not disclosed in the cited references.

Newly added Claims 21-26 contain features that are neither taught nor suggested by the references of record. For example, the references of record do not disclose or suggest a method including applying spraying to a removed portion where the undercoat layer has been removed at a spray particle speed of less than 300 m/s. Accordingly, these claims are in condition for allowance.

Consequently, in view of the above discussion, it is respectfully submitted that the present application is in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully Submitted,

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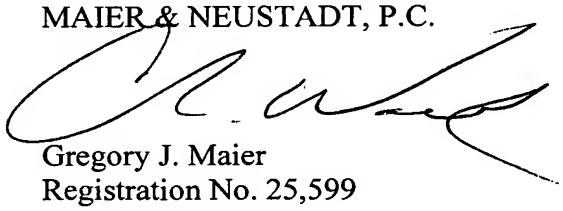

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